



Special Exercises to Develop Speed Endurance, Passing and Shooting Skills for Young Handball Players

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Abstract

The research objectives were to prepare special exercises to develop fast endurance for young handball players to develop fast endurance among players. The researchers used the experimental method to suit the nature of the research. The research community identified the players of Al-Qasim Sports Club, the junior category, whose number is (22) players, and its sample was selected in a simple random way, whose number is (16) players, and then they are divided into two groups, the first is experimental, with (8) players, and the second is control, with (8) players as well. The researchers concluded through the results of the research that the special exercises were effective in developing the capacity for speed endurance among the respondents. The development of speed endurance and increasing the players' ability to resist fatigue reflected positively on the players' performance in the basic handball skills tests with high efficiency. Benefiting from special exercises in developing speed endurance for junior handball club players, as it is one of the basic physical characteristics in developing offensive handball skills. Allocate 20-25 minutes of the final time for the main section of the training unit to develop speed endurance and during the special preparation stage, three times a week.

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INTRODUCTION

Sports training relies heavily on auxiliary sciences, including psychology, biomechanics, and physiology, which have contributed to providing the training side with a lot of data to help it raise the level of technical and physical performance (Chaouachi et al., 2009; Hussein & Shaalan, 2021). The physical attributes are among the basic components of the technical athlete's level, as we cannot develop the skillful and tactical performance except by developing these attributes and their interrelationship with the skillful and tactical aspects (Ehlert, 2021; Hrebid et al., 2022). One of the physical attributes that help the success of the sports training process and its continuity is the ability to withstand speed, which helps players to continue performing, maintaining their speed and resisting fatigue (Lyle & Cushion, 2016; Radhi Abdul Hussein et al., 2022). The speed endurance is one of the important abilities in addition to the rest of the characteristics (Fransson et al., 2018; Havolli et al., 2021; Stamenković et al., 2023). The modern handball game is one of the games with high physical exertion and has great physical requirements, including the importance of maintaining the fast pace of play by the players and the length of the game time and sometimes in extra times after the two teams are tied (Mohamed et al., 2022; Popowczak et al., 2021; Vila & Ferragut, 2019). As the performance takes the nature of strength, speed and common abilities between them due to the various offensive and defensive positions along the length match duration (Ameer et al., 2023; Pereira et al., 2018). The handball match requires the player to acquire high physical fitness as well as technical skills and mastery (Antohea et al., 2023; Carneiro et al., 2023; Hermassi et al., 2021). which means the importance of developing speed endurance that helps the player to continue performing skills and its various offensive repetitions throughout the duration of the match (Hermassi et al., 2020; Radhi Abdul Hussein et al., 2022). Therefore, the importance of the research

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in preparing special exercises to develop speed endurance, performance of passing and shooting skills in handball, the need for speed endurance has become necessary for handball players to perform skills throughout the duration of the match (Foretic et al., 2022; Nopianto et al., 2021).

Through the experience of the researchers being a player and a coach and watching the course of the youth league matches in handball, which is an important age group that needs good preparation and technical refinement, and its reflection on the preparation of national teams, The researchers noticed a decrease in the level of physical attributes and skillful performance (passing and shooting) from time to time during matches or in their last minutes or in their extra times, if any. As the player becomes in a difficult situation and requires them to perform a high physical and skillful work in front of a low level of speed tolerance, which negatively affects the implementation of his duties at the required speed, especially the attack, which leads to not achieving good results in the match. This indicates that the development of speed endurance did not take its wide range in the training programs for our coaches, which is reflected in the low skill, physical and tactical level of the player, and then the negative impact on the team's performance and the outcome of the match. Therefore, the researchers decided to study this problem in order to reach the goals to be achieved by developing special exercises to develop speed endurance and its reflection on raising the level of passing and shooting performance for handball players.

In some of the studies on the scope of 2018–2023, with the keywords "handball" and "speed" there are 21 documents. This data can be seen in Figure 1, presented with the help of vos viewer. However, research that describes exercises to develop speed endurance, passing and shooting skills for young handball players as seen through scopus data has not been done by researchers. The research objectives were to prepare special exercises to develop fast endurance for young handball players and to develop rapid endurance among players. and also identify the effect of special exercises on developing speed endurance, passing, and shooting performance for handball players. So the researchers hypothesize that there is a positive effect of special exercises in developing speed endurance, passing, and shooting performance in handball players.

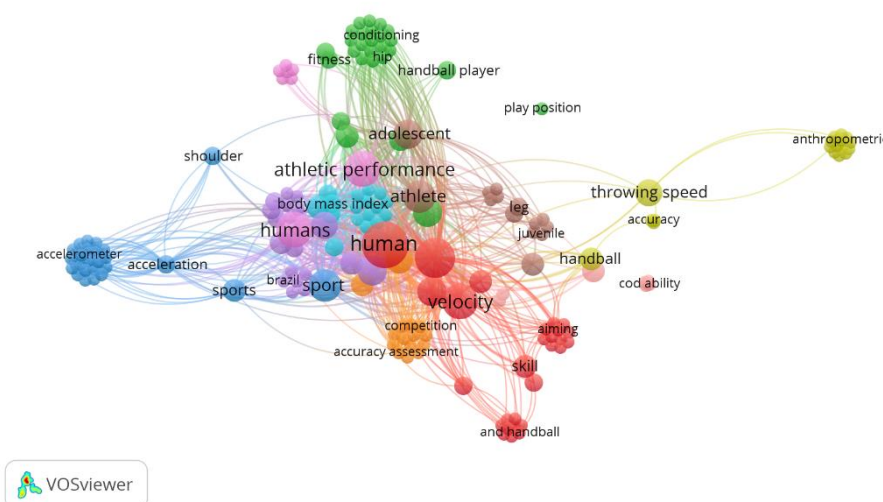


Figure 1. Scopus data for 2018-2023 with the keywords of the article title “handball” and “speed”

METHOD

The researchers used the experimental method to suit the nature of the research (Laura M. O'Dwyer, 2013). The research community identified the players of Al-Qasim Sports Club, the junior category, whose number is 22 players, and its sample was selected in a simple random way, whose number is 16 layers, and then they are divided into two groups, the first is experimental, with 8 players, and the second is control, with 8 players as well. Data collection methods Observation and experimentation, The tests, Questionnaire form. Tools and devices used in the research Handball court, Handballs for juniors (10), Measure tape, Two (2) electronic stopwatches, Computer (Pentium 4). Field Research Procedures Determine the most important forms of passing and shooting skills in handball for juniors. For the purpose of identifying the most important forms of passing and shooting skills in handball for juniors, the two researchers nominated a group of forms, which were placed in

a questionnaire form and presented to experts and specialists, who numbered 5 experts, and after collecting the forms and emptying the data, the forms were approved: Shooting from the center and from the level of the head, Shooting from the frontal fall, Shooting, jumping high, Passing the whip from above the head, Passing the whip from the level of the head from the fulcrum.

For the purpose of identifying the most important tests of endurance speed, forms of passing and shooting with handball for young people, the researchers nominated a set of tests, which were developed in a questionnaire form and presented to experts and specialists, whose number is 5 experts. After collecting the forms and emptying the data, the tests were excluded, which had a relative importance of less than 30 and a percentage of 60% and Table 1 illustrates this.

Table1. shows the relative importance and percentage of speed endurance tests, passing and shooting skills in handball.

N	Format	Relative importance	Percentage	Test result
1	Shooting by resting from the level of the head on the accuracy squares (50 x 50)	50	100%	✓
2	Shooting from stability from head level on rectangles	26	52%	X
3	Shooting by jumping high on the precision squares (50 x 50)	50	100%	✓
4	Shooting by jumping high on a goal drawn on the wall and divided into 5 circles	15	30%	X
5	Shooting from the frontal fall on the aiming precision squares (50 x 50)	50	100%	✓
6	Shooting frontal fall on overlapping squares measured in degrees	20	40%	X
7	Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	43	86%	✓
8	Whip passing from above the head in the form of a rectangle drawn on the wall for 20 seconds for a distance of 5m	18	36%	X
9	Performing whip passing from the level of the head towards the target, 30 m away from it	28	56%	X
10	Whip passing from the head level on an oval drawn on a wall 30 sec	42	84%	✓
11	Shuttle run test (25 X 8) from a high start	43	86%	✓
12	Running test (5 x 50 m), rest (45) seconds	50	100%	✓

Exploratory experience, The exploratory experiment was conducted on (6) junior players in handball, other than the research sample, on (20/1/2023) in the Al-Qasim Youth Forum for the studied tests, and the experiment was repeated on the same players on 27/1/2023, and that the purpose of conducting the exploratory experiment:

- 1- Ensure the validity of the devices and tools used in the research.
- 2- The level of difficulty of the tests for the research sample
- 3- Knowing the time required to carry out the tests.
- 4- Knowing the difficulties that the researchers face in order to avoid them in the future.
- 5- Extracting the scientific bases (reliability and objectivity) for the tests

Scientific foundations of the tests:

Validity of the test: One of the essential qualities that a good test must possess is validity. A test's purpose cannot be served by one with a low percentage of validity. The researchers gave the test materials to a group of experts and specialists in order to determine the validity of the tests for a candidate, and this is what happened. The expert on the accuracy of the information.

Test Reliability: To determine the candidate tests' reliability coefficient. The (test and re-test) approach was utilised by the researchers, with a (7) day gap between the first and second tests. Between the outcomes of the first test and the second test, the researchers calculated the reliability coefficient using the simple correlation coefficient, and they calculated the significant correlation using (Tr) for the significant. The scientists arrived at Because all of the calculated (Tr) values above

the tabular value of (2.77) at the level of significance (0.05) and with a degree of freedom (4), the test tests are very significant. which indicates that the tests have a high degree of reliability as shown in Table (2).

Objectivity: The objectivity of the test indicates that “the assessors do not differ in judging something or a specific topic”. The researchers employed the correlation coefficient for the objectivity of the tests between the degrees of the first judge in order to determine the degree of (arbitrators) for the tests. The data also supported the second criterion, which states that all tests are highly objective and significantly significant when the calculated (TR) values are more than the tabular (TR) value of (2.77) at a level of significance (0.05) and a degree of freedom (4). As shown in Table (2).

Table (2) shows the coefficient of reliability and objectivity of the tests

N	Tests	Reliability	Sig level	Objectivity	Sig level	Sig type
1	Shooting by resting from the level of the head on the accuracy squares (50 x 50)	0.90	8.04	0.88	7.18	Sig
2	Shooting by jumping high on the precision squares (50 x 50)	0.88	7.18	0.86	6.50	Sig
3	Shooting from the frontal fall on the aiming precision squares (50 x 50)	0.85	6.20	0.82	5.56	Sig
4	Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	0.87	6.28	0.84	5.93	Sig
5	Whip passing from the head level on an oval drawn on a wall 30 sec	0.84	5.93	0.89	7.61	Sig
6	Shuttle run test (25 X 8) from a high start	0.87	6.28	0.88	7.18	Sig
7	Running test (5 x 50 m), rest (45) seconds	0.89	7.61	0.90	8.04	Sig

Pre-tests: The researchers conducted pre-tests for the research sample on (29/1/2023) at the Al-Qasim Youth Forum before starting the main experiment, with all variables controlled. **Procedures for sample equivalence:** In order to verify the equivalence of the two research groups among themselves, the researchers worked by relying on the pre-test for all tests, as well as height and weight, and by applying the non-parametric statistical method (Mann-Whitney) to the results of the pre-test, as it becomes clear to us that the value of (Mann-Whitney) calculated It is greater than its tabular value of (15) for a sample of size (16) at the level of significance (0.05), and this indicates that the differences between the two groups are not significant in these tests, and this confirms the equivalence of both groups before conducting the field experiment. And as shown in Table 3.

Table 3. Shows the parity of the research groups:

Tests	Control		Experimental		Mann-Whitney calculated value	Sig type
	Median	quartile deviation	Median	quartile deviation		
Shuttle run test (25 X 8) from a high start	7.99	0.714	8.11	0.84	35	Non sig
Running test (5 x 50 m), rest (45) seconds	43.43	1.26	44.15	1.84	32	Non sig
Shooting by resting from the level of the head on the accuracy squares (50 x 50)	2	2.5	2	0.75	40	Non sig
Shooting by jumping high on the precision squares (50 x 50)	2	1.25	2	0.25	28	Non sig

Shooting from the frontal fall on the aiming precision squares (50 x 50)	2	1.5	2	0.50	35	Non sig
Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	14	1.75	13	1.25	22	Non sig
Whip passing from the head level on an oval drawn on a wall 30 sec	16	2.50	15	2.75	26	Non sig

Mann-Whitney tabular value = 15 at the significance level (0.05)

SPECIAL EXERCISES

The researchers applied their training curriculum using the high-intensity interval training method to verify the objectives and hypotheses of the research, and the researchers used some sources in preparing their curriculum. In evaluating the curriculum, it also relied on the opinions of experts and specialists in the science of sports training and handball training so that the curriculum is at a level commensurate with the ability of the sample as well as with the available capabilities and tools. Assistance to reach the sample to the level that develops the ability to withstand speed and the accuracy of skillful performance, The application of the training curriculum continued for eight weeks, at a rate of three training units per week, as (Abu Al-Ela Ahmed and Ahmed Nasr Al-Din) mention: "Speed endurance training is given 2-3 times per week" (Ahmed, Abu El-Ela & Nasr El-Din, Ahmed, 2003, p.198). Thus, the total number of training units is (24) training units. (20-25) minutes from each training unit are devoted to speed endurance and the application of the training curriculum prepared by the two researchers, which is applied at the end of the main section of the training unit. Thus, the total number of speed endurance training is according to The curriculum is (480-600) minutes. The implementation of the curriculum began on (1/2/2023) until (31/3/2023). The researchers relied on repeating the same training unit items during the first, second, third and fourth weeks to get the adaptation in such performance with increasing the intensity in the first three weeks and decreasing it in the fourth week to equal the intensity in the first week to be a compensation stage, then repeating the same training unit items during the fifth weeks. And the sixth, seventh, and eighth, with an increase in intensity in the fifth, sixth, and seventh weeks, and a decrease in intensity in the eighth week, to equal intensity in the fifth week.

Table 4. Shows the parity of the research groups:

The course duration	The number of weekly educational units	The total number of training units	Trib unit time for speed endurance	Total time for speed endurance training
8 weeks	3	24	20-25 min	480 – 600 min

Data Analysis.

Post-tests, After completing the implementation of the training curriculum on the experimental group, post-tests were conducted for the two groups (control and experimental) on (3/3/2023), and the tests were carried out in conditions similar to the pre-tests and their procedures and under direct supervision by the researchers. Statistical Methods, Median, Quartile Deviation, Simple Correlation, Mann-Whitney Test, Wilcoxon Test.

RESULTS AND DISCUSSION

Result

Displaying the results of the difference in the pre and post test of the passing and shooting skills tests for the control group members.

Table 5. shows the values of the median and quartile deviation of the pre and post tests, the calculated Wilcoxon value and its statistical significance for the results of the tests (the control group)

Tests	Pre-test		Post-test		Wilcoxon value	Sig value	Sig type
	Median	quartile deviation	Median	quartile deviation			
Shuttle run test (25 X 8) from a high start	7.99	0.71	6.10	0.65	3	0.137	Sig
Running test (5 x 50 m), rest (45) seconds	43.43	1.26	40.22	1.29	2.5	0.305	Sig
Shooting by resting from the level of the head on the accuracy squares (50 x 50)	2	2.5	3	2.75	4	0.061	Sig
Shooting by jumping high on the precision squares (50 x 50)	2	1.25	3	1.50	2	0.295	Sig
Shooting from the frontal fall on the aiming precision squares (50 x 50)	2	1.5	2.5	1	2	0.376	Sig
Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	14	1.75	17	2.50	2.5	0.177	Sig
Whip passing from the head level on an oval drawn on a wall 30 sec	16	2.50	18	0.75	3	0.461	Sig

Wilcoxon tabular value (5) at the level of significance (0.05), Presentation of the results of the difference in the pre and post test of the tests of basic offensive handball skills for the experimental group members.

Table 6. shows the values of the median and the quartile deviation of the pre and post tests, the calculated Wilcoxon value and its statistical significance for the results of the tests (experimental group).

Tests	Pre-test		Post-test		Wilcoxon value	Sig value	Sig type
	Median	quartile deviation	Median	quartile deviation			
Shuttle run test (25 X 8) from a high start	8.11	0.84	4.33	0.37	2	0.317	Sig
Running test (5 x 50 m), rest (45) seconds	44.15	1.84	36.18	1.17	1	0.288	Sig
Shooting by resting from the level of the head on the	2	0.75	4	1.25	1	0.393	Sig

accuracy squares (50 x 50)							
Shooting by jumping high on the precision squares (50 x 50)	2	0.25	4	0.75	1.5	0.259	Sig
Shooting from the frontal fall on the aiming precision squares (50 x 50)	2	0.50	4	1.50	3	0.115	Sig
Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	13	1.25	19	0.50	2.5	0.219	Sig
Whip passing from the head level on an oval drawn on a wall 30 sec	15	2.75	22	2.25	2	0.180	Sig

Wilcoxon tabular value (5) at the level of significance (0.05).

Presentation of the results of the difference in the post test of the tests of basic offensive skills tests in handball for the members of the experimental and control groups.

Table 7. Shows the values of the median and the quartile deviation of the post-test and the Mann-Whitney value calculated for the results of the tests (experimental and control group)

Tests	Control		Experimental		Mann-Whitney calculated value	Sig value	Sig type
	Median	quartile deviation	Median	quartile deviation			
Shuttle run test (25 X 8) from a high start	4.33	0.37	6.10	0.65	6	0.176	Sig
Running test (5 x 50 m), rest (45) seconds	36.18	1.17	40.22	1.29	4	0.183	Sig
Shooting by resting from the level of	4	1.25	3	2.75	0	0.612	Sig

the head on the accuracy squares (50 x 50)							
Shooting by jumping high on the precision squares (50 x 50)	4	0.75	3	1.50	1	0.359	Sig
Shooting from the frontal fall on the aiming precision squares (50 x 50)	4	1.50	2.5	1	5	0.619	Sig
Whip passing from above the head in a circular shape at a distance of 4 m for 30 seconds	19	0.50	17	2.50	0	0.157	Sig
Whip passing from the head level on an oval drawn on a wall 30 sec	22	2.25	18	0.75	0	0.517	Sig

The Mann-Whitney tabular value was (15) and at the significance level (0.05).

Discussion

When referring to the previous tables (4,5,6), we find that there is a development for the control and experimental groups, but preference is given to the experimental group. The researchers attribute that the reason for the development of the research sample is due to the exercises prepared by the researchers, as they were suitable for the capacity of the sample, and the capabilities of its internal organs, which caused appropriate changes that developed its performance, especially the muscle fibers. The speed that falls under the direct influence of the method, and this is what increased the sample's ability to withstand the speed, the fast fibers are able to deliver large amounts of power from a few seconds to a minute" (Díaz-García et al., 2023) this ability increases with the duration of training accordingly, the exercises contributed to raising the number of heartbeats to 180 beats through the use of various exercises with high intensity and relatively short periods of rest "Exercises that prepare for speed endurance should raise the heart rate to 180 beats per minute, then this is followed by a positive rest period that brings it down to 120 beats per minute, then the second exercise begins, but if the rest period is long and the heartbeat returns to its normal state, then this type does not develop the players' endurance of speed (Stamenković et al., 2023). Therefore, the curriculum designed to develop the ability of the respondents to resist fatigue through a variety of exercises and the use of appropriate intensity and gradual use of it was developed because of its direct impact on the functional systems in the body of the athlete (Hornstrup et al., 2019). The circulatory system works to send more blood to the muscles that perform their functions more efficiently and to produce new proteins that contribute to meeting the needs and requirements of exercises that can be performed in the future. All of this will undoubtedly raise the adequacy of the sample members, because the organized training that the sample followed according to the special exercises prepared was in a gradual, regular manner, and this regular and gradual increase led to a relatively stable and balanced organic adaptation with the continuation of raising the load and intensity in the curriculum, The organized training on exercises adapts the members and increases their ability to continue playing for a longer period with greater strength and intensity of load (Vala et al., 2022).

It is evident from the aforementioned presentation and analysis of the preceding tables that the juniors in both the control and experimental groups as well as the control group have improved their fundamental offensive handball skills. The players' consistency and regularity in training, together with the influence of the coach's regular curriculum, are all factors that the researchers believe contributed significantly to the development of the control group. The opinions of the experts,

regardless of their scientific and practical sources of culture, differ that the training programme inevitably leads to the development of achievement, if it is built on a scientific basis in organising and programming the training process, using the appropriate and gradual intensity, and observing individual differences, as well as the use of optimal repetitions and effective inter-rest periods under supervision. In terms of time, space, and training resources, specialised instructors should be utilized (Rafnsson et al., 2021).

The researchers attribute the reason for the great development that took place in the performance of the experimental group in the tests. The level of its performance increased due to the use of the exercises that the researcher developed in his proposed training curriculum, in which he emphasized the accuracy exercises for the most important offensive skills, which caused the reduction of time and an increase in the number of repetitions and the accuracy of performance, The training process has multiple aspects of physical, skill, tactical, psychological and cognitive preparation (Pityn et al., 2019; Ribeiro et al., 2021; Tee et al., 2018).

As the players' possession of high physical attributes helps them in the rapid skill development, which in turn is reflected in the tactical implementation and thus the psychological integration of the players through the improvement of their achievement, and this is what the experimental group showed in their positive tests. Also, the repetitions that were given to the exercises were appropriate so that they led to the occurrence of adaptation in the experimental group and also led to a development in their performance level of accuracy in performance, and the variety of exercises in the training curriculum gave a desire and excitement to perform them, provided that they are not monotonous in one style and lead to boredom and weakness. The desire to continue performing as well as training under difficult and multiple requirements imposed by the conditions of different playing situations, as it requires the player to make quick decisions under different requirements, sports achievements require a measure of muscular uses and the issuance of decisions so that the player is able to do so It is imperative to develop the physical, skillful and muscular capabilities (Farley et al., 2020; Zanevsky & Zanevska, 2021).

In addition to the link between physical and skill exercises, which give a tendency to perform them and gradually in their difficulty so that the player does not feel them as long as there is a distribution in the appropriate training load. The researchers also attribute the reason for the improvement to the increase in the training volume and intensity with the rationing of rest in the application of the training curriculum and its impact on the development of endurance speed, which had a positive impact in this improvement on the ability of the research sample to perform offensive and defensive skills. The development of skills must be accompanied by the process of developing physical fitness, as training processes that develop elements of physical fitness, including endurance of speed, as well as the development of motor skills, must be considered as two parts of one process. And the improvement of the time of offensive handball skills depends on other physical elements such as strength, speed and agility, and this indicates that the development of speed endurance had a positive impact on the development of other physical elements, and the researchers believe that physical exercises had an impact on improving the level of skillful performance, There is a close correlation between motor skills and the elements of physical fitness that the player acquires in the training process (Kokstejn et al., 2019; Meßler et al., 2018)

CONCLUSION

The results of the research showed that the special exercises were effective in developing the capacity for speed endurance among the respondents. The development of speed endurance and increasing the players' ability to resist fatigue reflected positively on the players' performance in the basic handball skills tests with high efficiency. Benefiting from special exercises in developing speed endurance for junior handball club players, as it is one of the basic physical characteristics in developing offensive handball skills. Allocate 20-25 minutes of the final time for the main section of the training unit to develop speed endurance and during the special preparation stage, three times a week. Preparing other studies and researches to develop speed endurance through different training methods and curricula, as it is one of the qualities that help the success and continuity of the sports training process and its impact on the development of other physical characteristics so that this characteristic becomes more effective in raising the physical and skill level of handball players.

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